WRC CEO, Dhesigen Naidoo

Gender and Water – moving beyond the thin end of the wedge

The end of 2012 saw the annual 16 days of activism against violence and abuse of South Africa's most vulnerable – women and children.

A few weeks before the start of the 16 days the media ran a seemingly unusual story, The ACLU or American Civil Liberties Union had begun an effort to get the US Army to revisit its policy that currently prevents women from serving in frontline combat zones. While the argument for complete equality is well understood, on the surface it may reflect a well-meaning military establishment that seeks to shield what it considers to be its more vulnerable half. On digging a little deeper, further facts emerge. A primary criterion for promotion in the US military appears to be combat experience. It would appear that the ACLU's case is in fact against a systemic gender discrimination that results in direct disadvantage for women members of the US Army that prevents the further gender diversification of the Army's hierarchy.

What this illustrates is that gender-based violence and abuse, as appalling as the statistics are, remains only the tin end of a very wide wedge (Fig. 1). The key question is this – do we have gender biased systemic fault-lines in our own system? If they exist, where do they express themselves? And of course, in the water sector, how should we deal with them?

An understanding of the wedge is imperative in empowering a systemic response to reverse its impact. In the water domain the impact of gender imbalances are found throughout the system and in all circumstances. However, as with most other discrimination, it is most pronounced in domains of scarcity and hardship. This is therefore a prominent feature in the developing world as a whole and Africa in particular. UNEP estimates that some 400 million Africans live in water scarce countries and 300 million Africans do not have reasonable safe access to water by any international standard.

UNIFEM (UN Women), the United Nations Entity for Gender Equality and Empowerment of Women, claims that women and children around the world travel some 10-15 km every day to collecting some 20 kg of water per trip. In South African alone women walk the equivalent of the journey to the moon and back 16 times every day to collect water. Water.org claims that, world wide, women spend some 200 million hours a day collecting water. The opportunity cost of this is very high. UNIFEM estimates that in India the estimated loss of potential income is 150 million work days a year for women which equates to R1,67 billion.

The WRC in its new five-year strategic plan prioritises Gender and Water and the work-plan is developed in four dimensions (Fig. 2).

The international dialogue that was launched on the African continent under the auspices of AMCOW (African Ministers Council on Water) in 2008 resulted in Water & Environmental Minister Edna Molewa's launch of the Policy and Strategy for Mainstreaming Gender in Africa's Water Sector in 2011. Earlier this year at Rio+20 this was followed up with an international dialogue on Gender and Water, led by Deputy Minister of Water & Environmental Affairs, Rejoice Mabudhafasi, at the UN Conference.

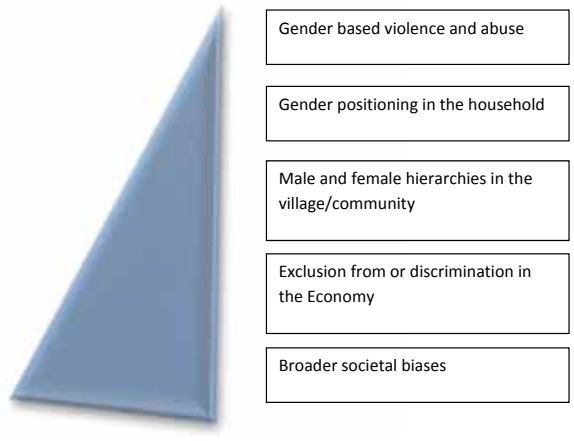

Figure 1

The Wedge of Gender discrimination travels through the trajectories of broader cultural and historical societal biases that impact on deepening the levels of gender imbalances in economic participation of women. These in turn have a tautomeric relationship with household hierarchies that usually result in embedding subservient roles and limited education for the girl-child. All of these, in various ways find expression in gender-based violence and abuse.

Figure 2

The WRC Gender and Water work-plan will operate in four dimensions. The first is an expansion and deepening of the dialogue. This will happen through workshops, seminars and local and international conferences. The second is through a series of mechanisms and studies to inform policy at all levels. The third is through a portfolio of gender specific research projects and Women oriented human capital development measures. Finally, we think that in 5 years, the WRC and its partners would have accumulated sufficient knowledge to produce significant best practice models, manuals and guidelines for gender improvement in the water domain.

The third leg on that journey was the Gender Session at the International Freshwater Governance Conference in November 2012. The lead speaker and renowned academic, Prof Ali Mazrui, reminded us of the traditional role of women as custodians of water in African cultural history. All of these endeavours will culminate in a WRC-partnered international consortium comprising the DWA, the GWP, IWMI and various other players hosting a Gender and Water Summit for Africa in 2013.

The end point of this multi-year journey is to achieve the aspiration that the current Head of UN Women and former President of Chile, Michelle Bachelet, expressed so succinctly: "Gender equality must become a lived reality."

Current WRC-funded women and water-related projects

- **Empowerment of women through water-use and land-use security**: Although the South African Constitution enshrines gender equality, women in rural areas generally experience a lack of water-use security and lack of knowledge to achieve food security. Empowerment of women through secure access to water and land, as well as by obtaining knowledge and developing skills must receive priority attention. This will provide the necessary incentives to take ownership of the process of productive use of water to achieve food security and improve rural livelihoods. This research project is aimed at improving the understanding of social dynamics at the household level that impact on the empowerment of women and attainment of sustainable food production. It includes better understanding of institutional and organisational impediments affecting the decision-making powers of women. The research is currently focusing on selected areas in the Eastern Cape and Limpopo provinces.

- **Decision-support guidelines for vulnerability assessments**: Climate change is already starting to affect some of the poor and most vulnerable communities around the world. Understanding sensitivities and vulnerabilities (including gender issues) of systems and communities is necessary to inform adaptation action. This research project is aimed at developing decision-support guidelines for vulnerability assessments and adaptation requirements around water and climate among rural economies and communities. This will allow decision makers to manage the vulnerability of communities, particularly women, and make the necessary adaptations within the larger context of planning and development.

- **Water allocation reform to achieve equity and gender balance**: This recently completed project focused on the achievement of redress of race and gender inequalities as water allocation reform is implemented. Lessons were interrogated from international experience and from initial implementation of various processes. This information is to be made available for improving immediate interventions. Existing studies on water allocation reform and trading of water rights in relation to economic development were also considered. Existing processes and instruments, some of which have been implemented in some catchments, and their contribution to redress race and gender inequities, were interrogated. Bottlenecks and hindrances were identified, and solutions suggested to improve the achievement of redress.

- **Improving nutrition in women and children**: Women and children are especially vulnerable to malnutrition. African leafy vegetables are commonly perceived to provide a host of health benefits, particularly nutritional benefits. A recently-completed WRC study showed that these plants can indeed contribute substantially to intake of Vitamin A and iron in both young children and women. The plants also provide a varying amount of other important nutrients which supports the use of a variety to address the nutritional health of vulnerable people.

- **Assessing basic services related to HIV/AIDS care**: A substantial burden of the care of people with HIV/AIDS has been placed on the elderly, school-going children, family members, friends and different care organisations within the community. These volunteer care-givers are mostly women and girls. The aims of this WRC project was to investigate home-based care practices with regards to the experiences of carers and to perform a health risk assessment of the water used for domestic purposes in households caring for people living with HIV/AIDS. The study confirmed that the burden of home-based care has disproportionately become the responsibility of women. Elderly women and young girls spend many of their personal and study hours looking after the sick. The lack of safe water in many areas of the country, the availability of water and the quantity of water have been highlighted as some of the most important aspects that prevent adequate home-based care.

Upfront Diary

Earth sciences
January 8-14
The 24th Colloquium of African Geology will take place in Addis Ababa, Ethiopia. The event is being held together with the 14th Congress of the Geological Society of Africa, which is celebrating its 40th anniversary. The theme of the conference is 'Earth Sciences solutions to African development challenges'. *Enquiries: Conference Secretariat; Tel: + 251-1-6554176; Email: egmea4geoscience@gmail.com; Visit: www.cag24.org.net.*

Wetlands
February 2
World Wetlands Day will be celebrated the world over with the theme 'Wetlands and Water Management'. *Visit: www.ramsar.org.*

Transboundary water
March 16-20
The International Conference on Transboundary Water Management 2013 will take place in Aveiro, Portugal. The theme of the event is 'Transboundary water resources management across borders and interfaces'. Topics to be discussed include water resources modelling, technical and natural solutions, environmental impacts, economic incentives, water governance and much more. *Visit: http://ibtwm.web.ua.pt/congress/*

Water storage & hydropower
April 16-18
An international conference on Water Storage and Hydropower Development for Africa will be held in Addis Abeba, Ethiopia. The conference is being organised by Hydropower & Dams, the International Commission on Large Dams and the Ethiopian Electric Power Corporation. *Enquiries: Margaret Bourke; Tel: +44 20 8773 7244; Email: africa2013@hydropower-dams.com; Visit: www.hydropower-dams.com*

More work needed to curb spread of invasive species – expert

South Africans need to think more innovatively about how they manage 'novel ecosystems' that are being created through the impact of human-mediated factors, including invasive organisms.

So says Prof Dave Richardson, Director of the Centre for Invasion Biology (CIB) at Stellenbosch University. He was speaking at the award ceremony during which he received the John F Herschel Medal from the Royal Society of South Africa late last year.

The medal recognises Prof Richardson's multidisciplinary contribution to science in South Africa and his internationally recognised work on the ecology and management of invasive species.

Prof Richardson was recently appointed as director of the CIB, a centre of excellence that aims to provide the scientific information and human capital needed to inform policy and management guidelines needed to reduce the number of invasive species and their impacts.

For Prof Richardson invasive species very often form part of a cocktail of factors that contribute to environmental problems. "They are both drivers and passengers of degradation."

He believes that the input of invasion biologists, who study how and why certain species are able to expand and flourish beyond their natural range, must be considered before decisions are made regarding issues such as the planting of new crops for the emerging biofuels industry, or the import of reptile species for the pet trade. "Strategies for dealing with invasive species need to give much more attention to the complex human dimensions of introductions and invasions. Humans cause invasions, humans perceive invasions, and humans decide why, when and how to manage invasions."

According to Prof Richardson, biological invasions are already costing South Africa several billion rand per year, and put huge pressure on our ecosystems. "Our rural communities are taking the brunt of such impacts."

Prof Richardson questioned aspects of the current approach to clearing invasive plants in South Africa." South Africa's strategy on a national scale, to clear invasive alien plants, needs to be substantially modified if impacts on our biodiversity are to be meaningfully mitigated," he stated. He highlighted the successful invasion of fynbos by woody plants, which has led to the transformation of natural ecosystems and has had severe impacts on, among other things, water catchments and fire regimes.

New WRC Knowledge Review shows growing support for water research

The latest Water Research Commission (WRC) Knowledge Review is now available.

The Knowledge Review, published every year, provides an overview of the Commission's investment in the creation and sharing of water-centred knowledge over the past financial year.

During the last year alone the WRC managed 332 research projects at various stages of the project lifecycle, of which about 79% were active projects. Research is aimed at addressing challenges within the sectors of water resource management, water-linked ecosystems, water use and waste management, as well as water utilisation in agriculture.

"The WRC supports the water sector with research products aimed at informed decision-making, improving monitoring and assessment tools, and making available a range of new and improved technologies related to water resource management, improved use of water in agriculture and the provision of water and sanitation services," writes WRC CEO, Dhesigen Naidoo. "The WRC continues to support the development of adaptive and mitigating strategies which will ensure the future sustainability of the country's water resources and services, in order to continue the economic growth trajectory and the improvement of quality of life within a sustainable development paradigm."

Total investment in the support of knowledge creation, sharing and dissemination amounted to R140,9-million. This represents an increase of 27% from the previous year. This investment includes about R3,2-million for the Water Information Network (WIN-SA), R1,7-million for the Framework for Education and Training in Water (FETWater), as well as other income leveraged for projects during the year under review. The investment in research projects expressed as a percentage of total expenditure was 67%.

Building capacity remains an important outcome of all WRC research as it strives to provide South Africa with future researchers as well as a source of skilled capital for other institutions within the water sector. Project leaders are encouraged to include students on their projects, enabling them to participate in water research through various projects supported by the WRC.

A total of 506 students were involved in WRC projects in the last financial year, 268 of which are previously disadvantaged. In many areas of research support by the WRC it is evident that students who participated in earlier WRC projects are now leading Commission-funded research projects and serving as members of steering committees as well as reviewers of new research project proposals.

In addition to its support for the training of students, the WRC initiated and supported a number of national capacity-building initiatives. These included support to national and local government as well as the development of new training material for different levels of learners and for academic institutions.

Water on the Web

www.iucnredlist.org
The IUCN Red List of Threatened Species is widely recognised as the most comprehensive, objective global approach for evaluating the conservation status of plant and animal species. The website offers latest data of endangered species around the world, but also facts and information on each species, from frogs, fish to trees and birds.

www.wateractionhub.org
The Water Action Hub is an online platform designed to assist stakeholders to efficiently identify potential collaborators and engage with them in water-related collective action to improve water management in regions of critical strategic interest. The Orange-Senqu basin is one of the strategic basins appearing on the website.

www.techtransfer.csir.co.za
The CSIR has launched a technology transfer portal. The portal is dedicated to the council's technologies transfer activities. It serves as a repository of relevant information on how the CSIR performs technology transfer, what its technology transfer preferences are, who the relevant contact persons are, and what technologies it currently has available for licensing.

WRC to receive R1-million as part of mine prosecution

The Water Research Commission (WRC) was to receive the first instalment in December of a total of R1-million to be paid to the Commission by Golfview Mining.

This follows the mining company's conviction in an Ermelo court in October last year for various contraventions of the National Environmental Management Act and the National Water Act. The mining firm was found guilty after illegally mining in a wetland; the diversion of water resources (i.e. the Holbankspruit, part of the Upper Vaal catchment); inadequate pollution control; and the unauthorised transformation of three hectares of indigenous vegetation.

As part of a plea agreement, Golfview was fined a total of R4-million (of which R1-million was suspended for five years). The remaining R3-million is to be paid to the WRC, Mpumalanga Department of Economic Development; and the Mpumalanga Tourism & Parks Agency.

The court also imposed an order that forces the mining company to rehabilitate the wetland according to an approved rehabilitation report. The potential cost of the rehabilitation has been estimated at between R50-million and R100-million. This penalty is said to be the largest imposed for environmental offences in South Africa.

WRC Research Manager, Bonani Madikizela, welcomed the conviction. "As a leading funder of wetlands research in South Africa for a number of years, it is very encouraging to receive acknowledgement for this effort. We hope that non-compliance with sustainable mining procedures will soon be a thing of the past. Hopefully this case will serve as a warning and reminder to developers to stay within the ambits of policy."

The court ordered that the monies received from Golfview may only be used for environmental research, awareness, protection and training within Mpumalanga. "This money will go a long way towards development refinement of water resource management methods," noted Madikizela.

Still time to submit papers to groundwater conference

The closing date to submit abstracts to the 13th Biennial Groundwater Division of the Geological Society of South Africa Conference & Exhibition, to take place in Durban from 17 to 19 September, is 10 March.

With the theme 'Groundwater: A New Paradigm', this conference aims to bring together students, academics, specialists and decision-makers to discuss and showcase groundwater and related activities.

The National Development Plan sets out bold plans and interventions to be achieved by 2030. Water plays a key role in most developmental plans. "With a large proportion of the country being served by groundwater it makes sense to take stock of our achievements within the groundwater sector as well as to frame the future role of groundwater within this developmental agenda, say the organisers."

According to the Groundwater Division, the role of the groundwater professional is likely to increase and the groundwater community should be prepared to engage society on the efficient management of this finite resource to ensure social, economic and environmental security. "The way groundwater is perceived by society and specifically decision-makers needs to drastically change to effect positive change. Key lessons from international experiences through international contributions will form part of this new groundwater sector roadmap.

Among the topics to be covered at the conference include groundwater and water-energy-food security; groundwater in a green economy; groundwater and infrastructure; groundwater and mining; groundwater as a catalyst for social development; groundwater and the environment; capacity development; resource economics; and knowledge gaps and innovations, among others.

For more information Email: *info@gwd.org.za* or Visit: *www.gwd.org.za*

Out with the old, in with the new as Swakopmund sewage works approaches finish line

The new Swakopmund Wastewater Treatment Works, in Namibia, is on track to begin treating up to 12 Mℓ/day of sewage by early this year.

The plant will replace the town's old wastewater treatment plant, which is overloaded and no longer complies with legislated discharge standards. The original plant was built in 1957, however, the town has since enveloped it, posing a health risk to residents.

According to mechanical contractor, Aqua Services & Engineering (ASE), a subsidiary of Veolia Water Solutions & Technologies, the sewage reticulation system will still drain and pump wastewater from various stations into a balancing tank at the existing works in town. However, once the new plant is operational, sewage will be pumped 9,8 km in a pipeline to the new plant, where it will be treated. ASE won the contract to supply and install the mechanical works for the new plant.

The new plant is designed for biological treatment by means of the activated sludge process. It includes biological nitrogen and phosphate removal. Final water treatment processes will include gravity sand filtration and disinfection with chlorine. "The new plant's discharge water will be of high quality for re-use in gardening and irrigation throughout the town," notes ASE MD, Christian Stöck. "Our firm considered the odour and vector-related problems, especially in the collection pump station still located in the centre of town, and employed specific technologies to ensure smells are eliminated."

ASE is responsible for all mechanical equipment, including the inlet works, biological reactors (with mixers and surface aerators), clarifiers, rapid gravity sand filters, chlorination and ferric chloride dosing equipment, sludge thickening, and the anaerobic digester equipment.

ASE started installing the mechanical equipment for the plant's activated sludge system in June last year. "The civil works are approximately 80% complete, which means, for us to meet deadlines, we needed to begin our installation, despite the civil works not yet being complete," concludes Stöck.

Conference proves there's value in your poo

Biodiesel, fertiliser, hydrophobic coatings, charcoal – these are all beneficial products that can be created from what we currently flush down our own toilets.

Sustainable sludge management is a growing concern worldwide, and was the centre of discussions among scientists, decision-makers and innovators at the International Faecal Sludge Management Conference, held in Durban towards the end of last year. The conference was hosted by the Water Research Commission (WRC) in partnership with the Melinda and Bill Gates Foundation and eThekwini Municipality.

Increasingly, faecal sludge was being seen as a resource rather than a waste," said WRC Executive Manager for Water Use and Waste Management, Jay Bhagwan. "After 200 years of wasteful flushing the science sector is now pushing the boundaries of sanitation, seeking sustainable ways of beneficiation."

More than 300 delegates from all over the world attended the conference, which showcased 50 innovative technologies and processes. It is hoped that these innovations could lead to the emergence of new businesses while addressing the sanitation crisis that exists in many developing countries.

According to Bhagwan, in most African countries (including South Africa) the focus is on the provision of new toilets while the maintenance of those already built still remains a challenge. South Africa, for example, has more than 1,7 million dry on-site sanitation systems, mostly in the form of ventilated improved pit toilets. Yet, many municipalities do not have any policies, budgets or procedures for the ongoing or emptying of these sanitation systems. "A rough estimate suggests that in the rest of southern Africa there may be another five million urban latrines, many of which will require emptying within five years," said Bhagwan.

The critical challenge for the reuse of faecal sludge is always going to be acceptance, said WRC CEO, Dhesigen Naidoo. "This is why we are investing in the cultural, social and psychological factors that will eventually make non-water dependent sanitation solutions the mechanism of choice for communities."

To view video clips of the conference, Visit: www.youtube.com/watch?v=PKh4ixNKO8o

Department commits more to Harties cleanup

Following the conclusion of the first phase of the Harties Metsi-a-Me programme at the Hartbeespoort Dam, the Department of Water Affairs (DWA) has allocated a further R258-million for operation and maintenance, as well full-scale implementation and extension on remediation of the dam.

DWA reports that it also intends to conduct an independent review of the programme. At the time of writing, the procurement to appoint the Water Research Commission as implementing agent to undertake the review was underway.

The remediation of the dam started in 2008. According to DWA, this had led to "significant improvement of the state of the dam and overall quality of the water." Through the programme some 98 t of dead fish were removed along with debris and hyacinth.

The effectiveness of interventions will continue to be reviewed on an ongoing basis by the Hartbeespoort Dam Inter-governmental Steering Committee.

Serious effort needed to prevent severe water shortages

While South Africa has no crisis in terms of water security, the country had to put in the necessary effort to prevent severe shortages that could lead to serious social and economic challenges, said the Department of Water Affairs (DWA).

"We don't have a crisis; we have a lot of options but those options require effort and money so the more we manage our water effectively, the better for all of us," said the department's Director for National Water Resource Strategy, Fred Van Zyl. He was speaking on the sidelines of a conference to explain the country's water resource strategy approved by Cabinet last year. The gathering was attended by representatives from the private sector, civil society, government officials and the agricultural sector.

The draft second national water resource strategy, released recently by Minister of Water and Environmental Affairs Edna Molewa, warns that South Africa is "at risk" if water is not taken seriously and interventions not applied timeously. It points to the need to protect freshwater sources, while improving the management of water across key economic development centres like Gauteng, Cape Town and KwaZulu-Natal.

Van Zyl said part of the solution was to impose restrictions on irrigation, tighten laws that govern water management and explore the possibility of sea water desalination. The latter, however, proved too expensive but it was something that South Africa needed to explore.

There was a need to invest strongly in water infrastructure in Gauteng, the major economic activities and mining. Evidence showed that if something was not done to improve the management of water, South Africa could experience serious water shortages as early as 2020. "We have to reuse where we can, we can do desalination...we can do a lot of things and research shows that we have to move in that direction and the most important thing is we need money," added Van Zyl.

The department would be urging stakeholders attending the conference to place water management at the centre of their water plans.

Source: SA News

New WRC project to help farmers squeeze more out of tight margins

Staying ahead of rising input costs while still maintaining profitable production has become a tightrope irrigation farmers in South Africa have had to master in order to stay in business. To contribute to the sustainable management of irrigation farming systems the Water Research Commission (WRC) is launching a new project this year focusing on the optimisation of electricity and water use.

The general objective of the project is to develop appropriate management approaches for reducing electricity cost, improving water use productivity and increasing profitability of irrigation farming for selected irrigation areas in South Africa. Among others, the project will review design norms and standards for irrigation systems, available methods to calculate electricity cost for irrigation and changes in electricity tariff structures over the last ten years along with current irrigation practice on farms. Furthermore, the key decision variables for reducing electricity cost of current and alternative irrigation systems will be determined.

The project will also seek to develop methods and models for calculating electricity cost, providing decision support for capital investment, operating cost and irrigation water management, as well as quantify the reduced system and lifecycle cost for increased profitability. One of the main products of the research will be a guidance report for optimisation of electricity and water use for sustainable management of irrigation farming systems.

Explaining the reasoning behind the project, WRC Executive Manager for Water Utilisation in Agriculture, Dr Gerhard Backeberg, says that electricity tariff structures have changed over the years. In addition, electricity rates have escalated considerably, with more increases expected in the near future. "This requires a change in design norms and standards as well as a shift in emphasis to lifecycle cost evaluation."

It has been ten years since the WRC has funded electricity and water use optimisation studies in the agricultural sector. This research output clearly needs to be revised and guidelines must be updated.

"Over the intervening years, new technologies have become available such as variable speed drive and energy efficient motors," notes Dr Backeberg. "Better engineering practices for pumps, including auto restart and remote control, have led to increased accuracy and energy efficiency. It is therefore essential to evaluate and compare different technologies on the basis of efficient energy/power use and operating cost over the lifecycle of the irrigation system."

"Farmers need advice and extension based on user-friendly guidelines in order to respond to pressures and incentives by changing irrigation practices."

In addition, better automatic weather stations are accessible and convenient irrigation scheduling techniques, such as continuous logging probes with telemetry, can be applied. This enables more efficient use of water, reduced electricity consumption and higher food production.

At the same time there are pressures to reduce the carbon and water footprint, especially for export food markets. "In so doing, costs must be lowered, profitability and competitiveness increased and water use productivity improved," notes Dr Backeberg. "However, farmers need advice and extension based on user-friendly guidelines in order to respond to these pressures and incentives by changing irrigation practices."

These practices that influence electricity power use include determining water use of crops, monitoring soil water content, applying the correct volume of water at the correct time of the crop growth stage, pumping water efficiently from the river or storage dam to the field, installing energy efficient motors, selecting correct pipe sizes and regular maintenance of equipment, among others. Measurement and verification therefore requires determining the baseline and implementing an information system for management of reduced energy/electricity consumption and optimisation of water use on irrigation farms.

The WRC project is expected to be completed in 2017.

A new project funded by the WRC aims to help farmers stay ahead of soaring water and electricity cost.